The Smart 64 Terminal

Plus 4

User Guide

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Note: If you are unfamiliar with terminal operations, we suggest you read pages 35 and following first. Then read the rest of this guide.

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Introduction

Welcome to the exciting world of telecomputing! Now you can reach out with the aid of your Commodore 64 beyond the confines of your home to a vast body of information, programs, and new people with similar interests. Public information services such as CompuServe, Dow Jones, and the Source, cover diverse subjects, including business, recreation, education, and news. The Smart 64 Terminal, your modem, and your phone line complete the link to the outside world.

The precise procedure for connecting your computer to a telephone system depend on your modem; how it interacts with the phone affects program operation. There are three main types of modems: manual, programmable, and intelligent. A manual modem, as the name implies, requires that you perform the actual dialing using your telephone handset. Programmable modems will provide auto-dial or auto-answer capabilities, but require a particular series of events from the computer program. The Smart 64 Terminal is compatible with the Commodore 1650 Automodem and other direct-connect modems. Intelligent modems contain their own computer, and can provide a number of automatic functions and usually allow the user control of adjustable parameters that affect performance depending upon your telephone environment. These modems are the most expensive, but are very convenient and more stable . We will discuss each type separately wherever applicable in this manual.

The Commodore 64 computer can be connected to a wide variety of devices. The complete collection of devices is called the "system configuration." Since most of this equipment is manufactured by independent companies, compatibility between devices and software may be unpredictable. Consult the Equipment Supported section.

Telecomputing brings with it a number of terms which may be unfamiliar to you. A glossary of terms can be found in the appendix. Some of these bear mentioning here. DOWNLOADING means to receive (and retain) information from another computer. UPLOADING is the reverse: sending of information to another system. A BIT is a single unit of information; a predetermined number of BITS comprise a BYTE, a unit of information representing a number, letter, or symbol. Inside your Commodore 64, BYTES are made of 8 BITS. In telecomputing, the bytes being transmitted are usually 7 or 8 BITS. The Smart 64 Terminal and your modem work together to correctly

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interpret the telephone bytes into Commodore 64 bytes. NULLS are bytes whose values indicates a "null character" and are used solely for providing time delays between devices. X-ON/X-OFF is a protocol, i.e. a defined procedure, for computers to pause transmission of information. It is used by the receiving computer to tell the sending that it needs to take a short "time out" to do something else. This procedure is by and large transparent to you. ON-LINE refers to being connected to another computer: OFF-LINE is the disconnected state.

What, exactly, IS a terminal emulator? To understand the answer to this question, you must first know that many computers 'talk' to their human operators thru devices called TERMINALS. These devices typically have a keyboard for typing commands to the computer, and either a printing mechanism or display screen. Those with the screen are called video display terminals (VDT). These are categorized by their inherent functions as either 'dumb' or 'smart.' The smart ones allow the computer to do such things as clear the screen, put the cursor at a particular location on the screen, etc. The dumb ones act as if they were printing terminals and only perform functions associated with the restrictions of paper movement, i.e., down only. A terminal EMULATOR, then, interacts with the host computer AS IF it were a terminal device.

The concept of 'smart' and 'dumb' terminals varies somewhat when discussing emulators. In this context, it is usually meant to define the emulator's ability to retain information it receives from the host computer. A dumb program merely performs the functions of a terminal device; a smart one can 'capture' information in one or more ways for further use later. Commodore 64 emulators usually store data in a buffer which is then stored on disk and/or printed. The Smart 64 Terminal is a smart emulator which can respond to the host computer as either a printing terminal or a Digital Equipment Corp. VT-52/VT-100 display terminal, depending on your choice and equipment. Information may be captured either in its memory buffer or with X-MODEM error checking protocol. Text files may be selectively printed and retained on disk. Text files of your own, created either on a word processor, or with a text editor may be sent directly from your disk.

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Plus 4 Changes

The Start-up procedure now lets you **choose** whether to load the Terminal Program or the file functions program.

Modem adjustments can now be made **instantly** while on-line.

User can toggle ECHO MODE. This mode "Echos" received characters, allowing the program to act as a 'HOST.'

Software ALPHA/LOCK is toggled from on-line mode.

The cursor has been changed to a rectangular, non-destructive cursor. The cursor/clock color is independent of the character color.

Program **STATUS LINE** displays modem setting, clock, buffer active, shift/lock, translate, echo, alarm, repeat keys, and formatting status, when on-line.

Modem, function keys, and color settings may be permanent or temporarily set.

Download filename defaults to last name used (Comm.Data on Start-Up).

CompuServe G4 graphics are displayed if you choose VT-52 ESCape codes.

X-Modem checksum File Transfers are now supported for compatibility with systems supporting Christiansen protocol.

Help Screens are optionally available for quick reference. They can be accessed in both menu and on-line modes.

Disk files can be printed from both File Function, and Terminal programs.

Memory buffer may be either stored on disk or printed directly.

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VT-52 Emulation in both 40 or hardware 80 columns modes.

VT-100 Emulation with DATA-20 XL-80 (80 Column card)

Maximum buffer size is 28K. Minimum is 12K. Actual size depends on hardware and use of help screens.

A talking version is available for use with the COMvoice speech synthesizer from Genesis Computer Corp. This variant operates in 40-column mode only, and requires the COMvoice.

NOTE TO USERS OF EARLIER VERSIONS.

System files created by SMART64.BUILD are different from earlier versions. You should create new User Disks for +4. (You can also re-build existing User Disks without disturbing any non-system files.)

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GENERAL BACKGROUND

Terminal programs have many different uses, depending on the needs of you, the customer. You may want to access public data-bases to get information. Perhaps you wish to take advatage of various electronic mail services. Your primary interest may be to trade public domain programs with other users. You may need to download data from a host, edit it, then send it back. All of these purposes, and more, can be met with the Smart 64 Terminal.

The various networks to which you can connect have an equally various set of rules to which both you and your terminal program must adhere for proper operation. These rules may include:

Modem Setting
Linefeeds required
Continuous/Line uploads
Translation/no Translation

Procedural rules, such as the syntax of commands, or the sign-on sequence, are the responsibility of the user. Note that the modem setting is often a confusing area. The default setting is suitable for 300 Baud operation to CompuServe. Many systems require 7-Bit/Even Parity operation. Transmission-Reception with conflicting settings will have unpredictable results, but generally will show up as garbled data or a non-response from the host.

The modem setting is comprised of the following elements:

1) Baud Rate
   This is the speed at which data is being sent. It can also be thought of as 'bits per second.' Each character of data is usually transmitted as ten bits.
2) Word Length
   This defines the number of bits used to identify the value of the character being sent. It is normally either 7 or 8.
3) Stop Bits
   The number of bits which identify the end of a character.

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4) Parity
Whether (and how) the validity of each character is checked
Even Parity means that the parity bit is set when the number of other bits that are set is odd.

5) Duplex
Historically means whether data can be sent in both directions simultaneously. Recently, however, and as applied here, it means whether the host will 'echo' your typed characters back to your screen. When talking to other micro's assume half duplex mode.

6) Handshake
This refers to the method of communications between the 64 and its attached device, normally a modem. 3-Line is used for modems; x-line is used for direct connection to another computer without using a modem.

Most computer systems, including Commodore, interpret the reception of a carriage return (Decimal 13) to mean 'return the carriage to the left-most position and advance one line'. Some, however, assume it to mean simply 'return the carriage to the leftmost position' and expect a separate line-feed character (Decimal 10) to advance to the next line. You have an option in Smart 64 Terminal to send a line-feed after return automatically.

Most computer systems can accept data in continuous stream, but some machines use software that demands data to be sent by the user in 'Line-Mode', meaning that the user must wait after sending a line of data until prompted for the next line. Two facilities in Smart 64 Terminal are provided which can be used when communicating with these systems. The first is 'nulls after c/r', which is set upon initiating an upload. This allows you to set delay factor: the actual time delay depends on the speed of transmission. Each null requires 10 bits of data (for purpose of calculation, assume that 1 baud = 1 bit), so that at 300 baud it takes 1 second to send 30 nulls. If you need to wait 3 seconds, then set the nulls to 90. The second facility is the prompted upload option: in this case, the program will send one line of data, and then wait for the prompt before sending the next line.

Translation is required in most operations, because Commodore Pet Ascii is not quite the same as industry-standard ascii, which defines the meanings of each byte of data. For instance, in standard ascii a decimal value of 65 represents an upper-case (capital) 'A'. Pet ASCII , however, considers a decimal 65 to be a lower-case (small) 'a'.

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The Smart 64 Terminal assumes that the other computer adheres to the industry-standard XON-XOFF protocol, also referred to as Control-S and Control-Q. Under this protocol, when one computer sends a decimal 19 to the second, the second will not transmit until the first sends it a decimal 17. The purpose of this procedure is to allow the computer receiving information an opportunity to pause for a period of time (undefined) to process the data in a manner which precludes it from receiving more data at the same time. The Smart 64 Terminal will send this sequence to the host computer when it saves buffer contents to disk, and when it performs a screen print. It also responds to the receipt of this request.

Among the characters which can be transmitted are numbers, letters, punctuation or other symbols, and control characters. A control character, as its name implies, conveys control information from one computer to another rather than content information (data). The protocol mentioned above, for instance uses control-s and control-q (Decimals 19 and 17 respectively). The character name (Control-Q) is derived from the keystroke combination on your keyboard which sends the character. A Control-Q is sent by holding down the CTRL key and simultaneously pressing the letter Q. Note that the following control characters can be sent using single keystroke commands on the Commodore 64 keyboard.

1) CTRL-C Run/Stop
2) CTRL-Q Cursor Down
3) CTRL-S Home

A common requirement for operations with some computers is the ESCAPE character. This character is CTRL : (colon) on your keyboard. Another requirement, especially with mainframes, is the ability to send 'BREAK' to indicate your desire to interrupt your current activity. The break function is sent by holding down the Commodore **COM** key (C=) and pressing **INST/DEL**. The break is not actually a character, but rather an interruption of the signals on the phone line for a specified period of time which varies between computers but is generally in the 200-350 millisecond range (thousandths of a second). Users of Novation SmartCat should note that their modem will not accept the break function from the keyboard, but instead has a special break command of its own: refer to your Novation User Manual.

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DO NOT SKIP THIS STEP

PREPARING A USER DISK

1. Turn **POWER ON** your equipment: printer, computer, moniter, disk
2. Insert SYSTEM DISK. DO NOT REMOVE THE WRITE PROTECT TAB.
3. Type on your keyboard : **LOAD"SMART64. BUILD",8** (return)
4. Wait for **READY** message.
5. Type: **RUN** (RETURN)
6. Follow the instructions in the program. You can use either new (un-formatted) or old (formatted) disks as target disks for the build. Smart 64 Terminal control files will be replaced, if present, on old disks; otherwise the data on the disk will not be disturbed. Selection of ESCape sequences will activate VT-52/VT-100 emulation and CompuServe graphics (VT-52 only) in the terminal program.
7. The build complete message will appear after all functions are finished. You may then choose to Build another disk, Load the Terminal, or Terminate to Basic.

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BOOTING THE SYSTEM

Be sure you have prepared a User Disk before following the normal boot procedures. See the previous page.

1) Insert the System Disk device 8, drive 0. If you have a dual drive, insert the User Disk in drive 1. If you have two single drives, insert the User Disk in the second disk device.
2) Enter : **LOAD "0:*",8,1 (RETURN)**
   Note: Users with 2031 drive enter **load"boot2Ø31",8,1**
3) Program will prompt you for screen type. Enter a number 0 to 4 as follows :
   0 = Normal 40 columns
   1 = Data 20 XL-80
   2 = Data 20 VideoPak-80
   3 = Batteries Included BI-80
   4 = VT-100 XL-80

Note: the talking voice will not offer these choices, since the Comvoice unit replaces 80 column hardware.

4) After a few seconds, the program will prompt for help files. Type Y if you want access to help screens, N if you do not. Note that the use of help screens is only available in normal 40-column mode, and will decrease buffer space by 8K.
5) After a few more seconds, the program will prompt for loading either the terminal or file functions.
   Press **function key 1** for terminal; **function key 3** for file functions.
6) Loading will continue for about 35 seconds. You will then be prompted for your User Disk, then press **RETURN**.
7) The program will access the User Disk for parameter information, then present you with the Menu Screen.

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The MENU SELCTIONS

The Smart 64 Terminal is divided into two main programs: the terminal, and the File Functions. Each of these displays a similar menu (choice of options) for your action. Some items on one menu refer to functions in the other program: selection of these items result in the other program being loaded. The menu is:

1. Go ONLINE (Terminal)
   Actual terminal functions here.
2. Close File (Terminal)
   Store downloaded data to disk.
3. Print file (Both)
   Print file's contents
4. Extract (File Functions)
   Review a file. Extract portions from a file to create a new one.
5. IMG to Program (File Function)
   Convert a file from CompuServe's IMAGE format into a program file. Used after downloading an Image File from CompuServe or another Smart 64 Terminal User.
6. Text to Basic (File Functions)
   Convert a sequential BASIC file. Used after downloading a BASIC program.
7. Basic Text (File Functions)
   Convert a BASIC program into a sequential file. Used to prepare BASIC programs for transmission to another computer.
8. Program to IMG (File Functions)
   Convert a program into an Image File. Used to prepare a program for transmission to CompuServe or another Smart 64 Terminal.

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9. USER-ID (Terminal)
Set or change parameters information about the computer you are calling. This includes your User ID, password, and other options described in the User-ID section.

10. Function Keys (Terminal)
Four of the function keys can be programmed to send up to 80 characters of text data with a single keystroke. This can be salutations, system directives, dialing for intelligent modems, etc.

11. Colors (Both)
This is used to set screen colors to your choosing.

12. Printer (File Functions)
Set up printer parameters here.

13. Modem (Both)
Set up modem parameters here.

14 Disk Wedge (Both)
This section provides commands for managing your disks. You can Scratch, Rename, Copy, Validate, Duplicate, and get a disk directory.

15. End (Both)
Returns you to power-on setting.

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On-Line Operation

Option 1 on the menu takes you to the on-line (terminal) section. Several actions take place before you are actually ready to connect to another computer. First, the Smart 64 Terminal checks to see if your User-ID has been defined, then asks you to name a file for any data you will download. NOW you're finally ready to make that phone call! Refer to the appropriate procedure below for your type of modem.

Manual Modems

1) The **Talk/Data** switch should be set to TALK.
2) Pick up the handset and dial the telephone number.
3) Wait until you hear a high-pitched sound (carrier).
4) Set the modem to DATA. You're now ready to communicate.

Skip ahead to Log-On.

AutoModems

1) The **Talk/Data** switch should be set to TALK; the **Originate/Answer** switch should be set to ORIGINATE.
2) Hold down the **COM** (C=) key and press **CLR/HOME** to start auto commands.
3) The program prompts with "Modem type x Command".
4) Set the modem to **DATA** and **ORIGINATE**.
5) Type "d" followed by the phone number and **Return**.
6) The program will dial the number and display it as dialing occurs.
7) When the connection is made the program will display **CONNECT**. You are now ready to skip ahead to Log-On.
8) If the connection is not made, the program will display **NO CARRIER**. You can redial the number, or try another number.

Intelligent Modems

We will use the Hayes Smartmodem commands in the following discussion. Refer to your modem manual for the proper commands for your modem.

1) Type **AT [RETURN]**
2) Modem responds with "OK."
3) Type **ATDP** followed by the phone number **[RETURN]**.
4) The modem will dial the number.

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5) If connection is made the program will display **CONNECT**. You're ready to communicate. Skip ahead to Log-On.
6) If the connection is not made, the program will display **NO CARRIER**. You can redial the number, or try another number.

Log-On Procedure

The precise sequence for log-on (sign-on) to the remote computer depends entirely on the prescribed procedure for that computer. Refer to your instructions for connecting. Bulletin Boards typically either require you to press **Return** a couple of times, or will send welcoming messages upon detection of a phone call.

Log-Off Procedure

Logging off a computer, like log-on, is particular to each system. For some systems, you can merely hang up the phone either directly or through a modem command. Others, however, may have a sequence you should follow to avoid being charged extra connect time. Refer again to your instructions for using the remote computer.

Now that you have disconnected, return to the menu by pressing **Function Key 8**. Any data which you downloaded into your memory buffer is still there. Use **Option 2** (Close File) to transfer the information to your disk. It will be stored there with the name you assigned when you first selected Option 1 (On-Line). Note that you can connect to another computer without first returning to the menu. Simply dial the new number as described above.

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Status Line

[Modem Setting] [Time Set/Baud Rate Factor] [Toggle Indicators] [Clock]

Modem Setting: Baud Rate
Duplex
Stop Bits
Word Length
Parity
Handshake

Time Set/Baud Rate Factor:
Indicates last setting of either alarm or clock. B.R. Factor is a 'Fine Adjustment' of baud rate, to allow variances between modems.

Toggle Indicators: RLAFTXE✓B
R = Auto repeat keys on
L = Linefeeds On
A = Alarm
F = Format lines on
Note: Comvoice version replaces this with **W** (words) or **C** (characters).
X = X-On received
E = Echo Mode On
✓ = Alpha Lock On
B = Buffer Active

Auto-Repeat Keys On

Keystrokes will auto-repeat if you hold the key down for a second or more. You may turn off this feature with **COM/R**.

Line Feeds On

When set, the cursor will not move to the next line on carriage return, but will return to the beginning of the line. When this is toggled off, a carriage return will advance the cursor to the beginning of the next line. Use **COM/L**.

Alarm

This indicates that the time set for alarm has been reached. Press COM Backarrow to reset.

Format Lines On

When set, word-wrapping is avoided: words which 'Wrap around' from one line to the next are moved to the next line. Toggled by **COM/K**.

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Translate
Characters to/from the modem are translated to/from PET ASCII and Standard ASCII when this indicator is on. This is the normal setting.

X-ON Received
This indicates that X-ON was received (either from the remote computer or your keyboard). Transmission to the remote computer is inhibited. You can reset by pressing **Cursor Down**.

Echo Mode On
This toggle causes received characters to be 'echoed' back to the remote, causing your computer to simulate a host. The remote computer should be in Full Duplex mode. This is useful when communicating directly with another micro. Toggled by **COM/E**.

Alpha Lock On
All alphabetic characters typed from your keyboard will be converted to upper case (capital letters), while non-alphabetic characters will remain unshifted. Toggle by **COM/Up Arrow**.

Buffer Active
This indicates that the received characters are being captured in your memory buffer. Toggled by **COM/RETURN**.

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Option 1 - On-Line

Select Option 1.

If you have not created a User-ID file (Option 9), Smart 64 Terminal will prompt you to create one now. You do that by answering the prompts, then answering **Y** to the prompt to make your answers permanent. Press **Return** at the end of each answer. Press **Return** alone to prompts to accept values displayed in parentheses (defaults).

User-ID:
Enter your user number for the service you will be calling.
Password:
Enter your password for entering the service.
Keying Limit (80)
This limits the number of characters you can type in a line. A response of **0** indicates no limit. Set this to the number of characters your host accepts in one line.
Clear Buffer Option (n)
Enter **Y** to have the opportunity to clear (reset) the buffer or save its contents when it fills. Answer **N** to always have the contents saved automatically.
Format End-of-Line (n)
This determines the setting for word-wrap control each time you select Option 1. You can toggle the setting in the on-line mode with **COM/K**.
Send Linefeeds (n)
Answer **Y** if your host expects a linefeed at the end of each line.
Prompt?
If your host prompts you for each line, then enter the one-character prompt it will send. This allows the host to control the rate of lines when you are uploading. Press **Return** if you do not get prompted by the host. (The program will set a delay count of **5** if you are not prompted. This means 5/60 of a second delay after each **Return**. The minimum is **1**.)
Modem Type

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Modem Type

Enter a number from 0 to 2 to define your modem type:

0 = Manual or Smart modems
1 = CBM 1650 or Westridge 6420
2 = CBM1660, Mitey Mo, or HesmodemII

Make changes permanent?

Answer **Y** to save your responses on your User Disk. The previous questions will not be asked again until you choose Option 9.

Before you can proceed, Smart 64 Terminal wants to know what to name your memory buffer. It prompts you with:

Download Filename (Comm.data)

You can accept the default or assign your own name. If your User Disk already has a file by the name selected, it will **append** whatever you download to the end of the existing file. Get familiar with the Disk Wedge commands. They let you change the names of files on your disk, make copies of files, or delete them.

Ready for Dial/Answer Command

You can now proceed to make a connection (Dial) or wait for one from someone calling you (Answer). You remain in on-line mode until you press **f8** to return to the Options Screen. You **are not** disconnected by Smart 64 Terminal when you return to the Options Screen. You do that first by logging-off the host or hanging up on the modem.

Dialing

See the instructions on page 12 for your type of modem.

Downloading

Your memory buffer is **not active** yet. Data on your screen is not captured unless the buffer is active. Turn it on by pressing **COM/Return**. You can turn it off again the same way. When the buffer is active, the **B** will display in the status line. The download arrow symbol will appear just below the clock on 40 column systems. This symbol drops down the side of the screen as your memory buffer fills.

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Uploading

Text (ASCII) uploading is started by pressing **f3**. Smart 64 Terminal will ask two questions:

Upload Filename. Enter the name of the sequential text file to be uploaded.

Delays after C/R. The wait time between lines. Use **0** if you are prompted by the host. Use at least **1** if you do not get prompted.

The Smart 64 Terminal will respond to **X-ON/X-OFF** signals from the remote computer to control transmission. A **CTRL-C** from either the remote or your keyboard will terminate an upload. When the upload ends, the program will display **Closing** [filename]. Note that you may at times receive garbled echo of your upload data. This can be caused by a number of different conditions. Adjusting the delay count for continuous uploads may improve screen echo.

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Using Auto Modems

You can build and maintain telephone dialing lists on your User Disk for automatic dialing with automodems. Let us walk through a sample of these features.

First, go to the On-Line mode. After you answer the Download Filename question, you are ready to enter Automodem Command mode. You do this by pressing **COM/ CLR-HOME**. The prompt "Command:" will appear on the screen.

To see the contents of the list currently in memory, type **V** and RETURN... using lower-case letters. The program will display nine numbers, in reverse video, indicating the nine list positions available, followed by their contents. The list should be blank when you first go On-Line. Let's build a new list. We do this with the **E**(dit) command. The format is **E** ‹List #› ‹Telephone #› and RETURN. Do **NOT** include the brackets. The list # is the position in the list. The telephone number may be punctuated to your liking : 8007771212 is the same as 800-777-1212 or (800) 777-1212.

Enter the following:

e11-800-000-0001 (RETURN)
e21-800 000 0002 (RETURN)
e31 (800) 000-0003 (RETURN)
e4 9,1(800)000-0004 (RETURN)

We just entered four numbers into our list. To verify this, type **V** (RETURN) to view your new list.

Now lets save this list on your User-Disk. The format is **S ‹Filename›** (RETURN), where ‹Filename› is a name of your own choosing (16 Characters maximum). We will save our sample as 'phone-list'.

sphone-list (RETURN)

Now 'phone-list' is permanently saved so you may use it again. You can retrieve the list from the disk for auto-dial use by typing **F ‹Filename›** (RETURN).

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HOW TO DIAL YOUR AUTOMODEM!

Load in your list from the previous page, and type **V** (RETURN) to show our list.

Note that the comma in number 4 specifies one-second time delay.

The general format for dial is **‹ACTION› (R) (Optional *)** (RETURN)

The actions are:
- ***** - Dial a single number
- C - Dial complete list
- D - Dial number from keyboard

So, if we want to dial the third number on our list, we type:

***3** (RETURN)

To do the same thing repetitively until a connection is made, we would type :

***R3** (RETURN)

REMEMBER TO SET YOUR AUTO-MODEM TO **D** FOR DATA AND **O** FOR ORIGINATE

To enter a command to the auto-modem, first press and hold **COM** and then **CLR/HOME**. You will be given a prompt that says, "Command:", indicating that the program is ready to accept an auto-modem command. Press **RETURN** to resume on-line mode. Note that some commands will keep you in auto-modem mode for an extended period of time, e.g., autoanswer, or continuous dialing.

COM with **CLR/HOME** to enter Command mode

COMMAND SYNTAX

All automodem commands are entered as a single string of information: do not use spaces between fields of entered information. Use lower-case letters when entering a command.

A	Autoanswer. Program enters answer mode until ring is detected. Press (and hold) any key to exit.
C	Dial complete telephone list. Dialing always starts from the first number in the list.
CR	Dial complete list and continue dialing until a connection is made. Press (and hold) any key to exit.
D ‹Phone *›	Dial number from keyboard.

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DR <phone #> Dial keyboard phone number continuously until a connection is made. Press (and hold) any key to exit.

E (list#)(Phone#) Edit (Enter) a phone number in the telephone list. List # may be in range 1 to 9.

F <Filename> Read a list from the User Disk.

S <Filename> Save a list to the User Disk.

V View current list in memory.

<list number> Dial a specific number from the current telephone list. Range may be from 1 to 9.

#R <list number> Dial a specific number from current list until a connection is made.

Help Screens

The Smart 64 Terminal includes 8 help screens which can be accessed from the terminal program to provide quick reference to operation. These screens reside in the 8K underneath BASIC, and decrease the amount of space available for your memory buffer. Their use is optional: you select them during the BOOT procedure.

HELP screens are accessed from the terminal program main menu by typing: ? (RETURN) in response to the' Choice:' prompt. Access in ON-LINE mode by pressing **COM/H**.

Movement within the help screens is prompted at the bottom of each screen: type **F** to move forward to the next screen, **B** to move backwards to the previous screen, and **Q** to quit back to the main menu program screen.

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X-MODEM FILE TRANSFERS

X-Modem is an error-free protocol for transfering files between two computers. Both the receiving and the sending terminal programs must specifically support the protocol in order for its use. X-Modem protocol reads and writes directly to the disk; your memory buffer is not affected. It is commonly used by many personal computers, as well as bulletin boards and some public systems. (It is sometimes referred to as Christiansen protocol after its creator, Ward Christiansen.)

Note that there are two variants of X-Modem: checksum and CRC. The Smart 64 Terminal uses the checksum method.

ON-LINE USE:

Press **COM/X**. The program will display : **XMODEM** and prompt for filename. Enter filename parameters as follows:

FILENAME,TYPE,DIRECTION

where: FILENAME is the name of the file.
Type is P - Program
S - Sequential
Direction is R (read) - Upload
W (Write) - Download

NOTE: the COMMAs are required.

What you see:

Uploading: Each successful block will display a "." on your screen. Error blocks will display an "N".

Downloading: Each successful block will display a "." on your screen. Error blocks will be identified by type of error:

S - Start Block Error (Error in Header)
C - Checksum error
D - Duplicate block error

The transfer will continue until successful completion, or it is aborted by user or by successive errors. The program will display either 'Completed' or 'Aborted'.

Note: you should delete (Scratch) an aborted file. The program does not do this for you automatically.

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USER-ID FILE

Each User Disk contains a USER-ID file which provides the program with information about operating characteristics. You will be asked the following questions.

USER-ID:
Enter your user number for the service you will be calling.

PASSWORD:
Enter your password for accessing the service.

KEYING LIMIT (80)
Enter the line limit before a return is required, or RETURN for 80.

CLEAR BUFFER OPTION (N)
Enter 'y' to have the option to clear (reset) the buffer when full or RETURN for Auto-Dump.

Format End-of-Line
Enter 'Y' to use Format End-of-line, or RETURN to by-pass.

Send Line-Feeds (N)
Enter 'Y' to send line-feeds to host after carriage returns. Normal response is 'N'

Prompt?
Enter the prompt character expected by the host computer to signal the start of the next line. Press RETURN if no prompt is expected.
Note: Use at least 1 null if uploading without a prompt character.

Modem Type
Enter a number from 0 to 2 to define your modem type as follows:

0 = Manual or Smart Modems
1 = CBM 1650 or Westridge 6420
2 = CBM 1660 , Hesmodem II or Mitey Mo

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Function Keys

The Function Key screen displays the message, "Press Function Key to set or Return to End." The Function Key numbers will be displayed down the left side of the screen in reverse video.

To program one of the keys, press the particular function key. A colon and the cursor will appear below the Function Keys on the screen. Now type the information you want to program into the key, including any RETURNs you wish to imbed. Press CTRL-@ to end the key definition. The screen will be redisplayed with the data you entered now appearing on the same line as the function key, in reverse video. (Imbedded returns will be displayed as checkmarks.) You may change the programming of a key in exactly the same way.

When you have completed the set-up of the function keys, press RETURN. The disk will be active for a few moments as the programming is stored for permanent recall.

On-Line: Press **COM/F**. The program will prompt for filename. Enter the name of the function key file that you wish to load, OR a filename for a NEW set of definitions you wish to create. The program will load the file you name; it will preserve current definitions for a NEW file. Now proceed with key definitions as described above. When you finish, the program will save them under the filename you entered.

MODEM SETTING

The standard (default) setting will be displayed the first time you select this option. Most users will not find a need to alter the modem setting. (Always refer to your on-line service's user guide.) The Default is:

1	Stop Bit
8	Word Length
300	Baud
No	Parity
FULL	Duplex
3-line	Handshake

These are standard settings for most videotext services. To change a setting, proceed as follows:

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Press the **CURSOR RIGHT** key until the name of the parameter you wish to change is displayed. Then press the **CURSOR DOWN** key until the setting you want is displayed in the status line. Press the '+' key to increase the baud-rate-factor, or '-' to decrease it. (Increasing fine-adjust will SLOW down the baud rate. The fine-adjust affects the baud rate currently displayed only.) Continue in this manner until satisfied with the modem settings. Press RETURN to exit modem adjustment. The program will ask you if you wish to make a new setting permanent for the current User Disk. Respond with Y for yes, or N for no.

COLORS

The Colors Screen will display the following:

F1	Border	(Black)
F3	Screen	(Black)
F5	Character	(White)
F7	Cursor/Clock	(Red)

Pressing one of the four function keys listed will change the color associated. The color in parenthesis is the default for a new User Disk. Adjust the color combination for maximum readability/minimum glare on your TV or monitor. When you are satisfied with the color setting, press RETURN. You are offered the choice to make the color changes permanent. Type Y to do so, any other key will assume a temporary setting. If you make the setting permanent, the disk will be active for a few moments while your color choices are stored for permanent recall.

Disk Wedge

The Smart 64 Terminal gives you the flexibility of using DOS 5.1 (C-64 Wedge) disk commands without leaving the program. Any wedge command beginning with ">" can be performed (except change device number), including Scratch, Rename, Copy, Validate, New, and Directory List.

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Commands are type exactly as with the Wedge. The ">" is presented on the screen, don't type it in. Simply type the rest of the command as you would in the wedge, and press RETURN. If the disk returns an "OK" status, you will be prompted with another ">". The other status message will be displayed before the next prompt. To return to the options screen, press return at the ">" prompt. Note: Dual drive users should use 1 as drive number.

Function	**Format**
Scratch a file	**S**Ø:‹Filename›
Rename File	**R**Ø:‹New name›=Ø:‹Old name›
Copy File	**C**Ø:‹New copy›=Ø:‹Old copy›
Validate	**V**Ø
New Disk	**N**Ø:‹Disk Name,‹ID›
What ‹Status›	**?** (Question mark)
Initialize	**I**Ø
Directory list	**$** (Dollar sign)

If the list exceeds 22 lines, the program will pause with the message "More." Press any key to continue listing.

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Printer Mode

A wide variety of printers and printer interfaces are now available for your Commodore 64. The Smart 64 Terminal sets the device number and printer open command according to your specification. The default settings are device number 4 and printer type Vic-1525E or compatible.

V	VIC-1515 VIC-1525	Printer is opened 4,4,7 and the screen is blanked during printer operations.
E	Vic-1525E	Printer is opened 4,4,7.

To change Device Number Type:	**d** (RETURN) ‹# desired› (RETURN)
To change Linefeeds, type:	**l** (RETURN) ‹# desired› (RETURN)
To change starting sequence, type	**s** (RETURN)
To change type of open, type:	**t** (RETURN) one of the choices: V,E (RETURN)

Start sequence is a user-specified command string to be sent to the printer when it is opened. The command string is specified as a series of decimal ASCII numbers, and may be used, for example, to set a matrix printer to a condensed print. The specific codes depend both on the printer and interface. Note that many codes fall in the range of 65-91, which is often translated to another value by printer interfaces. If this feature doesn't seem to work, try adding 32 to codes 65-91. Or alter the open type, according to the options available with your interface. The screen will indicate whether this feature is off or set. To set a start sequence, press "s" and you will be presented with the start sequence screen. Here you enter the code value(s) you want. Terminate by pressing RETURN at the Code: prompt.

When the choices are satisfactory, press RETURN. The disk will be active for a few moments while your printer setting is stored for permanent recall.

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Close File

This option stores any remaining download data from the memory buffer and then closes the disk file. This step is necessary before extracting information from the download file. You may find it useful at times to interrupt an on-line session, close the file, then resume on-line with a new download file. Each full memory buffer represents 112 disk blocks.(28k)

Note: If your on-line option is set for the Clear buffer option, you will get the 'Save or Clear Buffer?' prompt at this point.

Print File

This function prints any specified sequential file. Printing may be interrupted by pressing **Run/Stop** key, or paused be pressing SPACE BAR * (press space a second time to continue.)

Extract

The extract function allows you to review any sequential text file on the screen, and move parts of the original file to new sequential file(s). Use this procedure to separate program text or image files from the download file for subsequent conversion operations.

You may review the information with line-numbers attached (in reverse video) for determining boundaries of an extract, or without line numbers to see the data as it was originally seen.

You may pause the screen display by pressing the SPACE BAR. Use RETURN key to stop the review. Note: if your printer or printer/interface contains a multi/line buffer, these keyboard actions may APPEAR inoperative - be patient; the program is simply 'ahead' of the printer.

The system will prompt you for the starting line number to extract when it reaches the end of the file, or when you press the RETURN key. Enter the beginning line number to extract, or press RETURN to return to the options menu. If you enter a number you will then be prompted for an ending line number. After you have entered an ending line number the system will prompt for a filename (the first time).

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After the first extraction is complete, you will again be prompted for the Starting line number. Press RETURN if you are finished, or enter the starting line number of the next portion of download to extract. You will then be prompted for an ending line number. Enter the ending number. Now you will be asked if this portion of the extract should be saved under the same output file as the last portion. Type 'y' to add this part to the previous, or 'n' to start a new output file (You will be asked for another filename in this case).

Image to Program

This function reads a sequential file in .IMG format and produces a "SAVE" program file. You specify both filenames. The function will display the number of input blocks processed. Do not confuse this with disk blocks, which are 256 characters. The IMG block is 59 characters or less, beginning with a colon (:) and ending with a carriage return.

Error blocks are flagged on the screen. Errors may be caused by incorrect block length received, or by checksum failure. Each block contains a two-byte (hexidecimal) number, called a checksum, whose value when added to the values of all the values of all the numbers in the block results in a number evenly divisible by 256. (modulo 256)

Note: You can usually convert the first image file within your download file without performing an extract. That's because the Smart 64 Terminal simply ignores lines that are not in the IMG format. You can use this feature to save time and disk space.

Text to Basic

This function reads a sequential file of Basic Text and produces a "Save" program file. Only standard Vic/64 Basic commands are converted. Special, commands, such as basic 4.0 extensions, will be transferred directly as text. However, you can easily overcome this limitation, by later LOADing the created program file, listing problem lines, directing the cursor on the line, and pressing RETURN. The basic screen editor will correct the non-standard command properly assuming you have the expanded command software.

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active.

You will be asked the name of the text file you wish to convert. Press RETURN to return to the Options Screen, or enter the filename. Next enter the program filename being created. Do NOT use the same filename! The program statements are displayed as the conversion takes place. You will be returned to the options screen at the end of the process.

Basic to Text

This function is the reverse of Text-to-Basic. The Basic program you specify is read, and a sequential text file is created. Procedures are the same as Text-to-Basic. The output file created by Basic-to-Text is a PET ASCII file suitable for uploading.

Program to IMAGE

This function is the reverse of Image-to-program. The program file you specify is read, and a sequential Image file is created. Procedures are similar to Image-to-Program. The function will display a 'Please wait' message, and the current address (relative to zero) being processed, while the conversion is occurring. It will return you to the Options Screen at completion.

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What are IMAGE FILES?

An image file is a sequential file whose contents REPRESENT the binary code of a program file. The image file format is designed to be transmitted between computers while avoiding actual transmission of binary codes which might be interpreted as commands to some terminal and computer equipment. Each character (Byte) of information is represented by two ASCII characters symbolizing the value of the byte. The symbolic value is equivalent to the hexidecimal (Hex) code value. This is the same representation you will see if you display track and sector on your test/demo diskette supplied with your disk drive. The characters are grouped together as lines of data, each beginning with a colon (:) and ending with a carriage return. The first byte represented after the colon is a count of the number of data bytes represented in the line. This count will be 24 (18 Hex) for all but the last line. The next three bytes represent the total (in hex) of all previously sent data bytes. Then follow the data bytes. These are the program content. After the data bytes is the checksum byte and a carriage return. The checksum byte, when added to the sum of all previous represented bytes on the line, will produce a number evenly divisible by 256 (modulo 256).

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80 Column Operation

The Smart 64 Terminal will operate with 80-column boards from Data20 Corporation, and Batteries Included. You should follow the manufacturers instructions for entering 80.column mode, AND setting upper/lower case BEFORE loading the Smart 64 Terminal. Several features of the system are not fully usable in this mode, because of limitations with the 80 column board.

1) The Download Symbol is not visible. You must rely on the status line to tell you when the buffer space is active. Note also that you will not have use of the symbol to gauge available buffer space.

2) Formatted end-of-line should not be used in 80-column mode, since it is superfluous in this operation.

ComVoice Version

The ComVoice talking terminal version has two differences from the normal +4 program. First, the Formatted Lines option is replaced with a Word/Letter toggle. Second, a command-key action is added (**COM/V**) to toggle voice actuation.

COM/K	**Toggles words/letters**
COM/V	**Toggles voice on/off**

NOTE: The voicing of words deactivates the keyboard during phrasing. You will find that you will have to slow down your typing to coincide with this action. You can deactivate voicing or toggle words/letters during any input as well as on-line.

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Equipment Supported

Required:	Commodore 64 1541 Disk (or transparently attached IEEE disk) Modem (See list)
Optional:	Serial-bus printer (or transparent IEEE printer.)
Modems:	1600 Modem 1650 Modem 1660 Modem Westridge 6420 Hesmodem (manual) Hesmodem II Mitey Mo RS-232 smart or manual
80 Column cards:	Video Pak 80 from Data 20 Corporation XL-80 cartridge from Data 20 Corporation BI-80 cartridge from Batteries Included
IEEE Interfaces	Buscard II from Batteries Included

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User Disk Filenames

COLORS	Screen Color Definitions
COMM.DATA	Default file for download
FKEYS	Function keys 4-7 definitions
MODEM	Modem control definitions
PRINT.MODE	Printer definition
ASCII	Transmit/Receive table. This table is 512 bytes of ASCII codes: the first 256 bytes are the transmit table, the second 256 are the receive table.
USER-ID	User-ID/Password and online options.

Memory Map .....

0 - 828	System Ram
829 - 834	Utility Storage
835 - 1023	System Ram
1024 - 2947	VIC-II Screen Memory
2048 - 20479	MAIN PROGRAM AREA
20480 - 32767	Download Buffer Area 1
32768 - 40959	Download Buffer Area 1 or 80-col hardware
40960 - 49151	Download Buffer Area 2 or Help Screens
49152 - 53247	Program Space
53248 - 57343	I/O Chips
57344 - 65535	Kernal

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ON-LINE FEATURES

This section is meant to acquaint you with the various options and features available to you when using The SMART 64 Terminal. Some of this information will be repeated in the description of the various functions.

» BUFFER FILENAME: you may specify the name of the download file when you start an online session. If the filename already exists, then the information will be appended to the end.

» KEYING LIMIT: you specify the limit of keying data before a carriage return is required. The default is 80 characters. This limit may vary depending on the requirements of the network you are connected to. Enter Ø for no limit.

» CLEAR BUFFER OPTION: selecting 'y' will cause the system to stop when the memory buffer is full, so that you may either clear (reset) the buffer, or direct the buffer contents to the disk. If you select 'N', the system will automatically dump the buffer to the disk without your intervention. Note that in both cases the Smart 64 Terminal will suspend and resume communications with the network automatically.

» FORMAT END-OF-LINE: You may specify this option, which will then prevent 'word-wrap' (a word on a line wrapping around to the next line when it won't fit on the first line.)

» SEND LINE FEEDS: If the receiving computer requires linefeeds after carriage returns, you can set the program to do so automatically. The normal setting is to send carriage returns only.

» PROMPTED UPLOADS: You may specify a prompt character from the remote computer to signal the transmission of each line of you data. Pressing RETURN to this question will cause continuous uploading. Note: you must use at least one null when uploading in the continuous mode.

» ALARM TIMER: You may specify an alarm time to cause a visible and audible alarm to trigger when the limit is reached. This feature is very useful for budgeting your time (read costs). The alarm may be turned off after it triggers by pressing **COM/BACKARROW**.

» DYNAMIC BUFFER CONTROL: Downloaded data is captured in the memory buffer only when the download indicator is on. The indicator is an arrow enclosed in a box which will appear in the top right-hand corner of your screen. It always appears on the colors adjustment screen. If you do not see the arrow on the color adjustments screen it

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is because the arrow is set to the same color as the background: change either the screen or arrow color. The indicator is off when you first go on-line. Pressing the **RETURN** key while holding down the **COM** key acts as a toggle switch alternatively turning the indicator on and off. This feature allows you to by-pass data you do not want (such as repetitive menus.) to conserve buffer space. REMEMBER NO DATA IS CAPTURED WITHOUT THE DOWNLOAD INDICATOR.

» CONTROL CODES: the CTRL key is active when on-line, so that you may transmit a control character to the network computer by pressing CTRL and the appropriate control key. NOTE: holding the CTRL key too long may cause the 64 to jump into "slow screen" display, which may interfere with your intended transmission.

» USER-ID/PASSWORD: Pressing function key 1 will transmit your USER-ID. Pressing Function key 2 will transmit your password.

» USER FUNCTION KEYS: Function keys 4-7 are user defined. Each one may be set to transmit up to 80 characters to the network computer. The transmission of function key data is always terminated by a carriage return. This feature relieves you from typing repetitive information, such as salutations, sign-offs, control messages, etc.

» RETURN TO OPTIONS: Function key 8 will return you to the Options Screen. The download file is still open. So is the modem connection: remember that your on-line and/or telephone charges continue until connection is broken.

» UPLOAD FILES: Function key 3 signals the system that you wish to upload a text file residing on your disk. You will be asked for the name of the file, and the number of nulls to transmit after carriage returns. Nulls are not usually required on services such as Compuserve, but may be necessary in private networks. You may need to experiment to find the optimum number. Remember that at least 1 null is required if you did not speciffy a prompt character.

» ON-LINE SCREENPRINT: You can "snapshot" the contents of the screnn while on-line by holding down the COM key while pressing the £ key. Communications with the host computer is halted during the print operation. Your printer must be On-Line at this time.

» AUTOMODEM COMMANDS: Access the auto-dial and auto-answer commands while on-line by pressing **COM/CLR-HOME**. Available

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commands are listed in the automodem section.

» **COM KEY** (Commodore Key) is also used to invoke certain options screens directly while on-line. See the Special Keys section for description.

OFF-LINE FEATURES

» PRINT FILE directs any text file which you specify to the printer.

» EXTRACT lets you build new text files from the contents of your download (or other) file. You may specify multiple sections of your file to be copied into a new or multiple new files. In this way, you can save portions of your download for permanent storage without saving the whole file. This mechanism is also used to prepare files for processing by certain conversion utilities.

» IMG to PROGRAM converts a sequential file in CompuServe's IMAGE format into a "save" program file. Program size is limited only by disk space.

» TEXT to BASIC converts a sequential basic program listing into a "save" program file. Program size is limited only by disk space.

» BASIC to TEXT converts a BASIC program to a sequential file suitable for uploading to another computer. Program size is limited only by disk space.

» PROGRAM to IMG converts any program file to the Compuserve Image format suitable for uploading to another computer. Program size is limited only by disk space.

» USER-ID control lets you set up your User-ID/Password combination, so that they may be uploaded by function keys 1 and 2, as well as setting on-line options for operational control.

» FUNCTION KEYS control lets you set up function keys 4-7 to upload predetermined text. Each key can send up to 80 characters. Note that a carriage return is automatically sent at then end of the text. Additional function key files may be loaded while on-line, allowing any number of key definitions.

» COLORS control lets you select the particualar color combination you prefer for border, screen, characters, and cursor.

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» PRINTER control lets you set up the device number and open secondary command for your particualar printer/interface combination. A 'START' sequence can be sent to the printer for operation conditioning (assuming the printer will accept software commands.) You may also specify linefeeds to be sent to the printer after a carriage return (not necessary for most systems.).
» MODEM control gives you complete modem functionality, including half-duplex operation.
» DISK WEDGE simulates teh C-64 wedge to provide direct disk control without leaving the program. You may get a directory listing, scratch, rename, and copy files - even new or validate a disk.

The TRANSMIT/RECEIVE TABLE

Commodore (PET) ASCII is non-standard; consequently communications with other computers requires translation so that each computer 'understands' the other. The transmit/receive table performs the translation. This table is 512 bytes (characters): the first 256 bytes represent the Transmit Table, the second represent the receive table.

Transmission: the PET ASCII value of the key you press (0-255) is the index into the transmit table. At that location resides the character code in standard ASCII to be sent to the computer.

Reception: the standard ASCII character received by the modem is the index into the receive table. At that indexed point resides the PET character to be displayed/captured.

SMART64.CHANGE

The transmit/receive table created by the build utility will provide standard ASCII communications with remote systems so that most users will not have to alter them. Should you have a special situation, however, the utility named SMART64.CHANGE is included on the SYSTEM DISK for your convenience in changing the tables. It is possible, for instance, to create

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totally different character sets, such as EBCDIC, or to alter specific codes for instrumentation devices. Users of 80-column boards should note that the CHANGE utility operates in 40 Column C64 mode only.

1) Type: LOAD"SMART64.CHANGE",8
2) Type: RUN (RETURN)
3) Insert User Disk in drive as indicated in the "User Action" box.
4) Press RETURN
5) Wait for the program to read the tables.
6) Type **T** to view/alter Transmit table, **R** to view/alter receive table
7) The cursor (checkerboard) is positioned in the "Index" box.
   Enter the decimal value of the keystroke you wish to change.
   Refer to the "ASCII and CHR$" chart in your C-64 User's Guide
   Example: View current value of DELETE key
   Delete key is CHR$(20) in the manual
   Type: 20 (RETURN)
8) The current value is displayed in the "CODE" box. The program is now prompting you to press C to change the value, or S to save the current setting. If you press S you will return to step #6.
9) Pressing C will result in the current value being displayed in the "USER ACTION" box and the cursor being positioned in the "CODE" box. Enter the new value you wish to assign to the keystroke, and press RETURN. You are then returned to STEP #6.
10) When you have made all the changes you want, and you are positioned at step #6, press function key 1 to save the new table on your User Disk. This process will take a few seconds, after which you will be prompted to press RETURN and the program will end.

NOTE: You can abort the process at any time by simply pressing RUN/STOP. The tables on your disk will not be altered.

SOME EXPLANATIONS ON TERMS

DOWNLOAD refers to the information you receive from another computer, which you have captured. This means that the information on your screen

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was retained by the computer program, or that the data was captured directly to disk using a protocol. The SMART 64 Terminal captures data both ways. First, ASCII (TEXT) data can be retained in the memory buffer, also referred to as a CAPTURE BUFFER. The memory BUFFER is a temporary "HOLDING AREA" until the information is permanently stored on the USER DISK, which also contains information which controls the actions of the SMART 64 Terminal. (The process of saving the information to the disk is called a DUMP.) Second, you can download directly to disk using X-Modem protocol, provided that the remote system also supports this protocol.

UPLOAD means your sending information to another computer, More specifically, it refers to an automatic or semi-automatic method of transferring previously prepared DOCUMENTS, FILES, or LINES of data. Please see the section titled FILE TYPES for a full explanation.

ASCII stands for **A**merican **S**tandard **C**ode for **I**nformation **I**nterchange. No wonder everyone uses the letters! It is a standard definition of meanings or values assigned to each possible comination of BITS in a 7-Bit unit of information. There are 128 possibilities (0 to 127), and ASCII definitions for each. Notice that the standard defines 7-Bit units, and that your Commodore-64 uses 8-Bit Bytes as units of information. This descrepancy is handled by treating the combinations using the eight bit as the same value as the equivalent 7-Bit combination and needn't concern us. What does however, is the fact that Commodore "PET" ASCII does not follow the standard. Consequently, the program uses translation tables to "translate" the definitions between standard ASCII and PET ASCII. Two Tables are used: a TRANSMIT TABLE (PET to standard) and a RECEIVE TABLE (Standard to PET).

FILE TYPES

A **FILE** is the term used to refer to information which is stored in a computer-readable form outside the computer itself. Files are normally stored on tape or disk. Commodore computers recognize two types of files on tape: PROGRAM and SEQUENTIAL. Disk file types may be PROGRAM, SEQUENTIAL, RELATIVE, or USER. These file types are designed for different purposes and are normally used in quite different ways.

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PROGRAM files are, as the name implies, programs which are stored on tape or disk. Program files specify the memory location used when loaded, and (usually) contain program steps.

SEQUENTIAL files are the most commonly used for storing information, as oppposed to program steps. These files are designed to be read (or written) from beginning to end in a sequential manner. This means that you can't "look back" when using a sequential file. The particular format of information within a sequential file depends on the program that created the file.

RELATIVE files are also information storage files, but can be read or written in a random manner. A program can "jump around" a random file. These types of files are most commonly used in disk database programs.

USER files are files which have been created by an application program for a specific purpose. This type of file is seldom seen: many commercial software products specify their special-use files as PROGRAM. Yes, this is confusing, but a program can store information in a file which it defines as a program file, even though the file does NOT contain a program.

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A WORD ABOUT EDITORS

The Smart 64 Terminal expects you to use a text editor or word processing program for preparing upload text/message files. It further expects such files to be SEQUENTIAL, and will itself produce a SEQUENTIAL file when downloading. Several editors and word processors have this capability: check specifications before trying to use with the Smart 64 Terminal. Note that you can use the facility within Smart 64 Terminal for managing telephone lists in preparing short (up to 9 lines) messages for uploading. The program doesn't care if you enter phone numbers, or general text into the telephone list. Each line can hold up to 80 characters on information. Another method for preparing documents involoves using the program in half-duplex mode. Enter on-line mode, naming the download file with the name of the document you wish to create. Change the modem setting to half-duplex. Turn on your buffer. Type the message. Return to the menu and close the buffer.

Compatible Editors / Word Processors

Name.....	**Manufacturer**.....	**Compatible?**
Easy Script	**Commodore**	**YES**
PaperClip 64	**Batteries Includud**	**YES**
Wordpro 3+/64	**Professional Software**	**YES** (Upload)
SCRIPT 64	**Blue Sky Software**	**YES**

NOTE: this is a partial list. New word processors are constantly appearing on the market.

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WHAT IS A MODEM?

You know that a modem is a piece of equipment which connects your Commodore 64 to a telephone line, for the purpose of computer communications. MODEM stands for MODulator-DEModulator. This refers the process performed by the device, which is to convert computer information from its normal digital "pulse" for, to a frequency tone which represents the pulse on the telephone line. This is necessary because telephone equipment is designed for human voice communications, and such is an audible system. AT&T and the various telephone operating companies are in the midst of a long process of converting to digital voice communications, which may eventually eliminate the need for modems.

Computers do not speak the same language; in that regard they are similar to us. Computers also speak in "dialects" like humans. For this reason, modems have to do more than just connect your computer to the phone line. They also "condition" themselves to expect information to be sent and be received in program-specified ways. This conditioning is the "modem setting" which includes the following:

WORD LENGTH How many pulses (or bits) make up a unit of information (a byte).

STOP BITS How many pulses indicate the end of a unit of information.

PARITY Identifies whether or not the number of pulses representing "ones" and "zeros" are to be counted in each byte to check the correctness of the byte received.

BAUD RATE How fast are the pulses sent on the phone line? The Smart 64 Terminal can adjust up to 4800 Baud.

DUPLEX Are the characters you send echoed back to you? if they are, then the modem will be in FULL duplex, with information moving in both directions at the same time. Otherwise, it works in HALF duplex.

HANDSHAKE Refers to method of connection between your computer and the external device. 3-Line is used for modems, X-Line is used for directly connecting another computer or instrumentation.

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ON-LINE, OFF-LINE

On-Line is the communicating mode of the Smart 64 Terminal. This means that the program is sensitive to information being received from the modem, and is ready to transmit your keystrokes and/or upload files.

Off-Line refers to functions of the Smart 64 Terminal which are not directly related to telephone communications. These include various control, set-up, and file functions.

ON-LINE SPECIAL KEYS

NOTE: THE COMMODORE SYMBOL KEY IS 'COM'

CTRL	Used in conjuction with another key to send control codes to the host computer. EXAMPLE: To initiate (direct) contact with CompuServe, you send a CTRL-C by holding CTRL and pressing 'C'.
FUNCTION KEY 1	Sends USER-ID
FUNCTION KEY 2	Sends PASSWORD
FUNCTION KEY 3	UPLOAD file
FUNCTION KEY 4	Sends user-programmed data. The string in this key will automatically be sent as "answerback" to identifier request. (CTRL-E).
FUNCTION KEY 5	Sends user-programmed data
FUNCTION KEY 6	Sends user-programmed data
FUNCTION KEY 7	Sends user-programmed data
FUNCTION KEY 8	Returns to options menu
HOME	Sends CTRL-S (stop transmit) to host. If you press this key accidently, press CTRL-Q to resume communication.
CURSOR-DOWN	Sends CTRL-Q to host
RUN/STOP	Sends CTRL-C to host
COM/£	Screen print control. Pressing this key while online stops transmission to the host, and directs the screen contents to the printer.

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COM/RETURN	Toggles memory buffer
COM/CLR-HOME	Initiates Automodem command mode
COM/INST-DEL	Sends BREAK signal to remote
COM/BACKARROW	Resets alarm
COM/UPARROW	Toggles alpha shift lock
COM/A	Lets you set the alarm while online
COM/C	Calls screen colors option menu
COM/E	Toggles ECHO mode
COM/F	Calls function keys option menu
COM/G	Resets graphics mode.
COM/H	Calls HELP screens
COM/J	Set time of day clock
COM/K	Standard: toggle formatted lines COMvoice: toggle words/characters
COM/L	Toggle linefeeds
COM/M	Adjust modem setting
COM/O	Print memory buffer
COM/P	Set prompt character for uploads
COM/R	Toggle auto-repeat keys
COM/T	Toggle translate tables
COM/U	Calls User-ID screen
COM/V	COMvoice: toggles voice
COM/W	Calls disk wedge
COM/X	Start XMODEM transfer

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